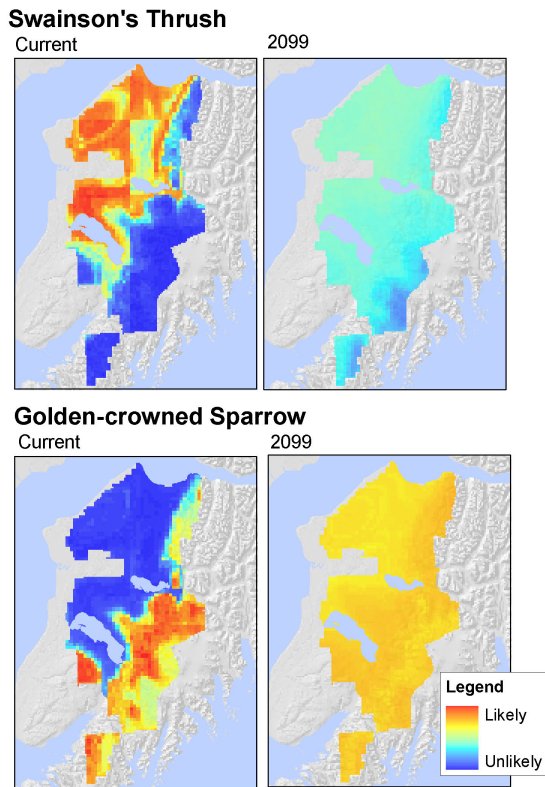


# Birds and climate change together

by Dawn Robin Magness and John Morton



*Kenai National Wildlife Refuge biologists are developing new tools to anticipate changes to bird distributions that may occur as the climate warms and weather becomes more variable. We are using statistical models to link where birds currently occur with historic weather conditions. The relationship between historic weather conditions and bird occurrence can then be used to forecast how birds may re-distribute themselves in the future based on climate predictions. The future climate is based on outputs from General Circulation Models run under a conservative climate change scenario in which carbon emissions stabilize and then decline.*

On December 19<sup>th</sup> volunteers will spend 24 hours focused on Soldotna's 2009 Christmas Bird Count. Every winter since 1983, local birders serving as citizen scientists have braved winter conditions to count all the birds found within a 15-mile diameter circle centered on the Kenai National Wildlife Refuge Headquarters. The birds found are compiled and entered into a

national database with over 100 years of observations.

With such a long history, these data have been instrumental in documenting how birds are responding to climate change. For example, scientists have used Christmas Bird Counts to investigate recent changes in the winter distributions of 305 North American species. Northward shifts in winter range occurred in 208 species over the past 40 years. Birds seem to be able to winter further north as milder weather conditions occur in January.

On the Kenai Peninsula, birds are wintering in places where they rarely did before. Short-eared Owls breed here, but migrate south in the fall. Recently, several individuals have been observed wintering in Seward and Homer. Last year a Short-eared Owl was seen flying across the Kenai Flats in January. Other new wintering species include American Robin and Rusty Blackbird.

Citizen science initiatives, like the Christmas Bird Count, are valuable for detecting changes in bird distributions because they provide a century of observations that span North America. These efforts provide early warnings of changes in species distributions as the climate warms. Early warnings are helpful, but can we make any educated guesses about what to expect with changing climatic conditions before it happens?

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Swainson's Thrush is a somewhat drab looking bird with a beautiful song. They are secretive, so birders are more likely to hear the flutelike, upward spiral of its song before seeing this thrush. Currently, Swainson's Thrush is a common breeder in forests on

the refuge. However, by the end of this century, this migratory bird may be unlikely to occur on the Kenai National Wildlife Refuge (see map). Other research suggests that the entire boreal forest region, which includes most of breeding range for Swainson's Thrush, will shift northward as the climate changes.

In contrast, Golden-crowned Sparrows may become a more widely distributed breeder on the refuge in the future. Currently, birders can find this chunky sparrow singing a distinctive "Oh Dear Me" every summer in sub-alpine habitats of the Kenai Mountains and Caribou Hills. But we already know that treeline is rising about three feet per year in the Kenai Mountains and encroaching into a diminishing alpine habitat in response to warmer climatic conditions. Initially, we expected that Golden-crowned sparrows would shift upward in elevation as the subalpine habitat rose with treeline. So the general expansion across the refuge was surprising. Will the refuge have more shrub habitat in the future?

The forecasted changes in bird distributions should not be thought of as an inevitable truth. Instead, forecasts should be used as thought experiments. Biologists can use forecasts to think creatively and formulate hypotheses about how and why an ecological transition might occur. Other studies and observations are then necessary to reduce our uncertainty about the new ideas generated from forecasts.

So refuge biologists have tools to anticipate change, but how should this information influence the management of refuge resources? We have management options. We can do nothing, we can manage habitats to promote the future condition, or we can manage habitats to sustain the current condition. For

Swainson's thrush, we could suppress wildfires to sustain existing forests. For Golden-crowned Sparrows, we could use prescribed fires to facilitate the transition of existing forests to shrub habitats.

For the time being, we'll do nothing and allow the landscape to change as it sees fit. However, the value of this kind of modeling is that we may decide that the demise of a population or the extirpation of a species is unacceptable to you (as the public we serve) or to us (as the Federal stewards of wildlife). We may choose to engage in management activities that try to maintain historic habitat conditions for existing wildlife or facilitate habitat transitions that may be beneficial for new wildlife.

The refuge's legislative mandate is to conserve the natural diversity of fish and wildlife habitats and populations. In a world where change is "natural," we would allow habitats and populations to increase and decrease with the natural cycles and disturbances that occur in the wild. However, in a world where a rapidly changing climate is driven by man's own activities, we have begun to question what is "natural" and perhaps how we define "natural." This kind of inquiry is more than philosophical if it will affect how we manage our wildlife resources.

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